

## CLAIM OR CLAIMS

We claim:

- Sub B<sup>2</sup>*
1. A vacuum-assisted resin transfer molding process, comprising the steps of:
    - (a) assembling a preform from suitable reinforcement, in a mold;
    - (b) tackifying the preform with a tackifier in the mold;
    - (c) vacuum debulking the tackifier preform;
    - (d) double bagging the debulked preform with an inner bag and outer bag to control bag relaxation and to improve vacuum integrity; and
    - (e) infusing resin to the debulked preform using a vacuum-assisted resin transfer molding process
  2. A composite made by a process of claim 1.
  3. In a vacuum-assisted resin transfer molding process, the improvement comprising using a double vacuum bag to improve vacuum integrity.
  4. The improvement of claim 3 further comprising the step of infusing the resin into the preform tilted at an angle off horizontal.
  5. The process of claim 1 wherein infusion occurs with the preform tilted at an angle off horizontal so that gravity at least partially opposes flow of the resin into the preform.
  6. The process of claim 1 wherein the inner bag is applied to the preform at an elevated temperature.
  7. The process of claim 1 wherein vacuum debulking occurs at an elevated temperature to better bind the tackified preform together.
  8. The process of claim 1 wherein the reinforcement is carbon fiber, the tackifier is a plasticized epoxy, and the resin is epoxy.
  9. A process for controlling bag relaxation behind the wavefront in a vacuum-assisted resin transfer molding process wherein resin is infused from a source

at atmospheric pressure into a preform in an environment under a vacuum bag at a controlled pressure below atmospheric pressure, comprising the step of:

applying a breather and second vacuum bag over the original vacuum bag.

*Aut B* 10. An improved vacuum-assisted resin transfer molding process for infusing resin into a preform, the improvement comprising:

introducing resin at the lowest point in the bagged preform assembly so that infusing resin flows against gravity through the flow media and preform, thereby providing improved control of the wavefront by higher resistance to flow than with horizontal infusion.